ALBERTA FOREST GENETIC RESOURCES COUNCIL

2001 2002

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Message from the Minister

I am pleased to release the 2001-2002 Annual Report of the Alberta Forest Genetic Resources Council (AFGRC).

This second annual report highlights the significant contributions made by the Council in genetic conservation, tree improvement, and the enhancement of forest productivity and forest health, which mirror the objectives in the Alberta Forest Legacy document.

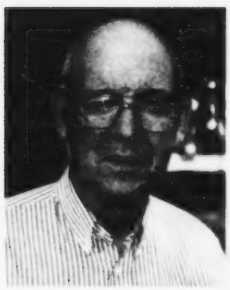
The Council has also made significant contributions in generating discussion on genetic conservation, and tree improvement.

During this past year, the AFGRC built on its goal of establishing a foundation for the management of forest genetic resources; it focused on building upon better communication structures, and offering advice and recommendations to government on matters of policy. In fact, the Council generated three significant policy positions over the past year on tree improvement, forest genetic resources and conservation, and genetically modified organisms.

The Council has broad representation from the scientific community, the forest industry, the biological sector and both provincial and federal levels of government. This structure lends itself to a free flow of ideas, and the Council is continuing to prove itself a valuable asset to the department in the face of rapidly changing technology and scientific advancement. I appreciate their valuable advice to the department and look forward to future years of exciting challenges for the Council and the department.

Honorable Mike Cardinal
Minister of Sustainable Resource Development
MLA, Athabasca/Wabasca Constituency

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT



Message from the Chair

Forest genetics and tree improvement have really come into their own in Alberta this past year, making for an eventful and productive time for the young Council. The enthusiasm of Council members and their eagerness to tackle new issues prompted a realization that we should convene more frequently to maintain continuity and provide adequate time to address the many issues being brought forward. Our schedule now includes a minimum four meetings a year.

There was one membership change during 2001-2002. Dr. John Spence, incoming Chair of the Department of Renewable Resources at the University of Alberta, replaced Dr. Jim Beck (outgoing Chair) as one of the three members representing the Scientific Community. Our sincere thanks go to Jim for his strong contribution to the Council in its inaugural years.

Without doubt, the major activity on the genetics front has been development of the Alberta Forest Genetics Framework policy. A number of Council members are actively involved in development of the framework, and Council has been kept apprised of issues and progress on a regular basis. Council members will be asked to provide their input and advice regarding the framework prior to its adoption and implementation.

Council addressed several other policy issues during the year. Development of a provincial Forest Genetic Resources Conservation plan is an ongoing initiative which is regularly reviewed by Council. There are parallels between this plan and the genetics framework and we're finding that each adds value to the other.

Great interest was generated around the topic of reforestation with non-native trees. The presentation of an Alberta Sustainable Resource Development report entitled "Implications of the Use of Non-Native Trees for Reforestation of Public Lands in Alberta" to Council sparked considerable debate, which will continue in the 2002-2003 year.

Council embarked on development of a new Forest Genetic Resources Benchmarking program for Alberta, and is working towards taking on the role of communicating with stakeholders on the status and performance of forest genetic programs.

These are exciting milestones in a very important area of policy and practice for Alberta's forest practitioners and the general public. Please read on to learn more about our work over the past year, and contact me at any time if you require further information.

Cliff Smith,
Chair, Alberta Forest Genetic Resources Council

Council Activities 2001-2002

Council dealt with a number of standing issues at its meetings through the year. These included the status of tree improvement in Alberta, the ongoing development of an Alberta Forest Gene Resources Conservation policy plan and the Cooperative Forest Genetics Initiative between the Government of Alberta and the University of Alberta. The provincial government also moved forward with creation of the Alberta Forestry Research Institute, which may have some linkages to Council's work. Other activities included the following:

- In June, 2001, Dr. Herb Cerezke presented his paper, co-authored with Dr. Donald Lester, entitled "Implications of the Use of Non-Native Trees for Reforestation of Public Lands in Alberta" to Council. Alberta Sustainable Resource Development (ASRD) commissioned the paper. Council members recommended some revisions to the paper, which were made and brought back to the September, 2001, meeting. Council also moved, in response to concerns raised by Alberta Fish and Wildlife, that ASRD consider a process to deal with the ecological and biodiversity concerns related to the use of non-native trees for reforestation on public land. A draft concept dealing with potential biodiversity effects and mitigation opportunities was presented in September, 2001. This led to a decision that Alberta Sustainable Resource Development would arrange for a further review dealing with the biological aspects of non-native trees. In March, 2002, the Alberta Research Council presented a report on the ecological and biodiversity impacts of reforestation with non-native species. The paper was accepted as a discussion document.

- The September, 2001, meeting included a presentation on the IUFRO International Symposium on Ecological and Societal Aspects of Transgenic Plantations held in Stevenson, Washington, in July, 2001. Dr. Dennis Joyce of the Ontario Forest Genetic Resources Program provided a summary of his program to Council. In response to a suggestion that Council's position on GMOs was too narrow, the matter was revisited in September, 2001. The revised position can be viewed at the Council's web site.

- In December, 2001, Council discussed a draft paper dealing with ownership and access to forest genetic research and related data. Several revisions were recommended. Discussions continued at the March, 2002, meeting. The paper will form part of the Alberta Forest Genetics Framework policy.

- A benchmarking program for Forest Genetic Resources was also discussed in December, 2001, resulting in a motion to have the province proceed to detail benchmarking terms of reference that would form the basis for a funding proposal. A revised Terms of Reference for the program was presented in March, 2002, and members asked for a rewritten proposal to be brought to the June, 2002, meeting.

Tree Improvement Status

Tree improvement in Alberta involves more than 20 programs in eight native species, of which six are coniferous and two are deciduous. All programs are based on traditional plant breeding methods, and no genetic modification (GM) is involved. The first coniferous programs were initiated in 1976, and new programs have been added on a continuous basis.

Most programs include genetic gain as a primary objective, although some are designed primarily to alleviate seed shortages. Conservation of genetic diversity and maintenance of adaptability to natural environments are among the primary objectives of all programs.

Several exotic species are also under consideration, either as pure species or as parents in hybrid programs. While some companies have initiated independent programs, most programs are being developed through cooperative arrangements either among companies, or between the Alberta Land & Forest Division (LFD) and single or multiple companies. Several programs are also being developed by LFD alone.

The older programs are beginning to mature and some orchards have produced considerable amounts of seed for operational deployment. A broad genetic base has been accumulated, and grafting in ex situ reserves has preserved thousands of wild genotypes. Progeny tests associated with the older programs are yielding healthy, fast-growing individuals for inclusion in the next generation's breeding population.

Coniferous programs are summarized below.

	# of Programs	Parents in Programs	Parents under Test	Genotypes in Orchards	Trees in Orchards
western larch	1	27	0	18	79
jack pine	1	68	0	82	331
lodgepole pine	6	1,713	1,633	468	7,941
black spruce	3	211	190	148	1,617
white spruce	9	11,260	718	756	7,496
white/Engelmann spruce	1	98	0	0	0
Douglas-fir	1	47	0	38	120
Total	23	3,424	2,541	1,480	17,574

Programs for deciduous species were initiated more recently. Several private companies have been investigating or developing programs in aspen, balsam poplar, hybrid poplars, and birch since the early 1990s. The focus of these programs is adaptation, growth rate and insect resistance, as well as stock production and establishment.

A group of forest products companies initiated the first aspen cooperative program in 1994. Since then, hundreds of genotypes have been selected and tests have been established on a number of sites. A hybrid-breeding program involves Populus tremula from Europe and P. davidiana from eastern Asia. Research in silviculture, stock production and breeding techniques has been key to the aspen work.

The proposed Alberta Forest Genetics Framework will encourage investment in tree improvement activities by establishing a framework for program development and accrual of benefits, while defining standards to ensure that genetic diversity and conservation objectives are met.

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	# of Programs	Parents in Programs	Parents under Test	Genotypes in Orchards	Trees in Orchards
western larch	1	27	0	18	79
jack pine	1	68	0	52	321
lodgepole pine	6	1,713	1,633	468	7,941
black spruce	3	211	190	148	1,617
white spruce	9	11,260	718	756	7,496
white/Engelmann spruce	1	98	0	0	0
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Forest Gene Resources Conservation Plan

A provincial plan and strategy for conservation of the forest gene resources of Alberta was presented and reviewed in 2000. The decision was made to work toward implementation, with periodic reporting back to Council.

Leonard Barnhardt, of the Alberta Tree Improvement and Seed Centre, presented progress reports at the June 8, September 14 and December 14, 2001, meetings. A summary outline of the plan and implementation strategy can be viewed on the Council's web site.

Implementation work in 2001 has included

- Completion of digitized draft seed zones, which are to act as the spatial and ecological units for in situ conservation. These are presently being reviewed and revised along with the Natural Region and Natural Subregion boundaries (seed zones will be nested within subregions);

- Development of a list of native tree species of Alberta in consultation with Parks and Protected Areas staff. Mapped information on the ranges of these identified species is available from Parks and Protected Areas and the Forest Management Branch;

- Creation of linkages between the conservation plan and in situ conservation standards in the draft "Management and Conservation Standards for Forest Tree Genetic Resource in Alberta" (AFGF draft standards). Also, linkages with the protected areas program through an agreement with Parks and Protected Areas to work jointly on tree genetic resource conservation;

- Prioritization of the conservation effort. Alberta Natural Heritage Information Centre has provided a list of forest species with a provincial and global score of vulnerability to decline. Limber pine and whitebark pine have been put on the Alberta watch list. Significant advances have been made on developing partnerships, linkages with forest genetic resource management policy, background material and information required for gap analysis and prioritizing of species.

Alberta Forest Genetics Framework

The year under review saw the near-completion of a proposed Alberta Forest Genetics Framework policy for public lands within the province's Green Area.

The Alberta Forest Genetics Framework (AFGF), is scheduled for adoption in late 2002 and implementation in 2003. It represents an exhaustive effort by over 40 scientists and resource management experts from government and industry. While the AFGF is not directly an initiative of Council, a number of our members have been actively involved in its development. Council has been informed of issues and progress of the AFGF on a regular basis. The draft policy will be presented to Council at its first meeting of the 2002-2003 year. Members will provide their input and advice regarding the framework prior to its adoption and implementation.

The framework provides an integrated group of policies and technical standards to guide management and conservation of coniferous and deciduous forest genetic resources programs in Alberta.

Four major policy streams of the AFGF are:

- Green Area Deployment;
- Breeding, Testing and Verification;
- Materials Collection, Handling, Registration and Storage;
- Production of Controlled Parentage Materials.

Technical task groups comprising eight to 12 members representing industry and government developed each policy stream. An expert committee of forest geneticists supported these task groups. A Primary Task Group that met on a monthly basis drove the entire process.

The AFGF utilized a unique approach to policy development that involved experts and practitioners from both the private and public sectors. Its balance of conservation and tree improvement imperatives means that the framework should carry with it a high degree of credibility and support for years to come.

The Issue of GMO Trees in Reforestation

GMO trees (genetically modified or genetically engineered) are created by gene splicing biotechnology. Genes or DNA segments that carry the desired traits are inserted in the genome of the tree to be modified.

Genetic modification may be done to attain a wide range of traits, including insect and disease resistance, herbicide tolerance, wood quality and growth rate. GMO trees offer considerable potential for increasing wood production and wood quality from a limited land base, but their impacts on the environment and biodiversity are poorly understood. This is of particular concern with regard to forest tree species, which are very long-lived and have a lasting impact on ecosystem structure and function.

There are also legal and ethical issues related to deployment of GMOs in the natural forest, particularly on public lands. The federal government regulates environmental release of GMO trees. In order to obtain approval, the proponent must obtain a permit to carry out research and testing, and prove the environmental bio-safety of the work.

Council reviewed the status of GMO tree development in Canada and the opportunities and threats these may pose. No GMO trees have been planted in operational forest plantations on Crown lands in Alberta. A forest company carried out a confined research trial on private land in Alberta but the trial was later discontinued and is now in a five-year post-monitoring phase. Although no proposal for planting GMO trees in Alberta is expected in the foreseeable future, the Council decided to take a proactive stand on the issue and developed the following position statement:

- Council recognizes the theoretical potential of GMO trees in reforestation;
- Council recognizes that performance of GMOs and their impacts on forest ecosystems are poorly understood;
- In view of the potential risks currently associated with reforestation using GMO trees, the Council does not recommend use of GMOs for reforestation at this time;
- Council recognizes that ongoing research will improve our understanding of the performance and impact of GMOs;
- Council will review its recommendations periodically.

Benchmarking - Forest Genetic Resources Programs

The benchmarking of forest genetic resources programs in Alberta will provide objective quantification of how our programs are performing, compared to similar programs in Canada and elsewhere.

The Alberta Forest Genetic Resources Council decided to undertake development of a benchmarking project in April, 2000. Further work was carried out during the past year to define the scope of the exercise and the areas to be covered. The main objectives are to generate clear and measurable evidence of program performance on a periodic basis, and to retain the flexibility that will be required for Alberta to adjust programs in response to new knowledge and evolving environmental and social needs.

Following are the four benchmarks, and the means by which they will be measured:

1) Conservation:
   - In Situ Conservation
   - Ex Situ Conservation
   - Tree species and populations of concern
   - Policy and restoration activities for populations of concern

2) Tree Improvement:
   - Improved stock production and usage
   - Involvement and commitment of stakeholders
   - Enhancement of forest productivity and tree health
   - Maintenance of genetic diversity

3) Education:
   - Formal education
   - Continuing education
   - Extension and outreach
   - Public awareness

4) Administration and Management:
   - Planning
   - Implementation
   - Monitoring
   - Policy framework
   - Research

An independent agency will be chosen to carry out evaluation and review of the project, once terms of reference for its implementation have been developed.

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